

R E M A R K S

Reconsideration of this application, as amended, is respectfully requested.

THE SPECIFICATION

The Examiner objected to the abstract for reasons that are not clear. Nevertheless, the abstract has been amended to put same in better U.S. form and it is respectfully submitted that the amended abstract is in full compliance with the requirements of MPEP 608.01(b). Accordingly, it is respectfully requested that the objection to the abstract be withdrawn.

THE CLAIMS

The claims 1 and 23 have been amended to clarify the feature of the present invention whereby the container which accommodates the micro reactor keeps an atmosphere on a periphery of the micro reactor at a pressure of not more than 1 Pa, as supported by the disclosure in the specification at, for example, page 19, lines 1-5. See also (now canceled) claim 12.

In addition, claims 1, 2, 5-7, 11, 23, 26 and 27 have been amended to make some minor grammatical improvements and to correct some minor antecedent basis problems so as to put the claims in better form for issuance in a U.S. patent.

No new matter has been added, and it is respectfully requested that the amendments to the claims be approved and entered.

THE PRIOR ART REJECTION

Claim 1 was rejected under 35 USC 102 as being anticipated by US 2002/0081471 ("Keegan et al"); claims 1, 2, 4-9, 11, 12, 23 and 25 were rejected under 35 USC 102 as being anticipated by USP 6,562,496 ("Faville et al"); claim 24 was rejected under 35 USC 103 as being obvious in view of the combination of Faville et al and US 2003/0015093 ("Wegeng et al"); and claims 10, 26 and 27 were rejected under 35 USC 103 as being obvious in view of the combination of Faville et al and US 2002/0110712 ("Struthers et al"). These rejections, however, are respectfully traversed with respect to the claims as amended hereinabove.

According to the present invention as recited in amended independent claim 1, a reformer is provided which comprises: a micro reactor having a flow path for a fluid, and a container which accommodates the micro reactor and keeps an atmosphere on a periphery of the micro reactor at a pressure of not more than 1 Pa.

In addition, according to the present invention as recited in amended independent claim 23, a reformer is provided which comprises: a micro reactor having a flow path for a fluid, a

container which accommodates the micro reactor and keeps an atmosphere on a periphery of the micro reactor at a pressure of not more than 1 Pa, and adsorption means for adsorbing a medium which is present inside the container and which propagates heat.

With this structure, the inner pressure of the container accommodating the micro reactor is set at a considerably low value, i.e., 1 Pa or less. Thus, a medium which can conduct heat to the vicinity of the micro reactor is thin, and the micro reactor can be heated by a small amount of heat.

On page 4 of the Office Action, with respect to claim 12, the Examiner asserts that the pressure of the atmosphere in the container is a "method of operating" the device of the present invention. It is respectfully pointed out, however, that as recited in amended independent claims 1 and 23, the pressure of the atmosphere in which the container accommodates the micro reactor is a structural feature of the present invention, as a physical characteristic of the atmosphere in the container in which the micro reactor is accommodated. In addition, it is respectfully submitted that none of the prior art of record discloses, teaches or suggests this structural feature of the claimed present invention.

As recognized by the Examiner, Keegen et al discloses a reformer 210 provided in an enclosure 220, and a reformer

pressure control section 230 to control the pressure differential between the reformer 210 and the atmosphere in the enclosure 220.

It is respectfully pointed out, however, that Keegen et al does not disclose, teach or suggest keeping an atmosphere on a periphery of a micro reactor at a pressure of not more than 1 Pa. In fact, Keegen et al notes that "oftentimes it is desirable to operate the reformer with a higher pressure in the enclosure 220 as compared to the pressure within the reformer 210" (paragraph 0061]). According to Keegen et al, this structure encourages fluid leaking from the reformer to be driven back into the reformer.

In addition, it is respectfully submitted that with the structure of Keegen et al, the medium on the outside of the reformer is driven toward the reformer. Thus, the medium can absorb heat from the reformer and transmit heat to the reformer. In this manner, the medium can easily affect (decrease or increase) the heat of the reformer, which may inhibit efficient control of the heat of the reformer.

Given the small size and resultant small heat capacity of a micro reactor, even slight variations in the amount of heat applied to the micro reactor can change the temperature of the micro reactor. If a micro reactor exchanges heat easily with the outside in the manner of the reformer 210 of Keegen et al in the structure of Keegan et al described above (in which the pressure

in the enclosure is high and gas is in the vicinity of the reformer), then it would be difficult to set the temperature of the micro reactor at a predetermined temperature.

By contrast, with the structure of the claimed present invention, the inner pressure of the container is set at 1 Pa or less so that the heat medium is sufficiently reduced. Thus, the temperature of the micro reactor can be maintained even if the difference between the temperature of the micro reactor and that of the outside is large.

With respect to Faville et al, it is noted that this reference discloses a blower 110 that pressurizes chambers 102, 104 and 106 (see Fig. 1). According to Faville et al, the main plenum 102 is pressurized to a pressure P1, and air at a pressure of P2 is blown through plenum 104 and into the hotbox 106, which is maintained at a pressure P3 lower than the pressure P2. See Fig. 1 and column 9 of Faville et al.

It is respectfully submitted, however, that although Faville et al discloses a "thermal management" (cooling) system, this reference does not disclose, teach or suggest a container which accommodates the micro reactor and keeps an atmosphere on a periphery of the micro reactor at a pressure of not more than 1 Pa, as according to the present invention as recited in amended independent claims 1 and 23.

It is respectfully submitted, moreover, that the other prior art references of record also do not disclose, teach or suggest a container which accommodates the micro reactor and keeps an atmosphere on a periphery of the micro reactor at a pressure of not more than 1 Pa, as according to the present invention as recited in amended independent claims 1 and 23.

In view of the foregoing, it is respectfully submitted that amended independent claims 1 and 23, and claims 2, 4-11, and 24-27 respectively depending therefrom, all clearly patentably distinguish over all of the cited references, taken singly or in any combination, under 35 USC 102 as well as under 35 USC 103.

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Entry of this Amendment, allowance of the claims and the passing of this application to issue are respectfully solicited.

If the Examiner has any comments, questions, objections or recommendations, the Examiner is invited to telephone the undersigned for prompt action.

Respectfully submitted,

/Douglas Holtz/

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